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GLACIAL DRIFT UNDER THE SAINT LOUIS LOESS

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Glacial drift in the vicinity of St. Louis seems to have been described first by Professor A. H. Worthen, in 1866.¹ In 1890, Professor G. Frederick Wright² reported glacial drift in the following localities within the city limits: (1) Near Forest Park, on the road to Ferguson, beneath 20 feet of loess was a bed of gravel 2 or 3 feet thick, which contained granite and other pebbles two to three inches in diameter, some finely striated; (2) at Hyde Park a similar section was seen; (3) in the vicinity of Shaw's Garden. Loess had been removed for brick making, uncovering extensively a gravelly stratum which contained many granite pebbles. Striae were found on angular limestone fragments. The elevation was 150 feet above the Mississippi River.

H. A. Wheeler, in a paper "On Glacial Drift in St. Louis," in 1895,³ reported blue glacial clay or till 12 feet thick, at West Pine Boulevard and Taylor Avenue, extending westward to Euclid, underneath 10 to 15 feet of loess. The diameter of the boulders is said not to exceed one foot. Among the erratics reported were red and gray granite, diorite, dolerite, and quartz-porphry.

In 1896 James E. Todd⁴ described boulder clay in St. Louis. His section may still be seen on Laclede Ave. near Sarah St. The till is 8 feet thick, "a reddish brown or a waxy red clay," containing granite and other foreign pebbles. The overlying loess is 16 feet thick.

Frank Leverett, in his monograph on the *Illinois Glacial Lobe*,⁵ reported deposits of glacial derivation underlying the loess for a few

¹ A. H. Worthen, *Geology of Illinois*, Vol. I, p. 314, 1866.

² G. F. Wright, "The Glacial Boundary in Western Pennsylvania, Ohio, Kentucky, Indiana, and Illinois," *Bulletin* 58, *U. S. Geological Survey*, p. 72, 1890.

³ H. A. Wheeler, "On Glacial Drift in St. Louis," *Transactions of the St. Louis Academy of Science*, Vol. VII, pp. 121, 122, 1895.

⁴ J. E. Todd, *Missouri Geological Survey*, Vol. X, pp. 162, 163, 1896.

⁵ F. Leverett, *The Illinois Glacial Lobe*, Monograph XXXVIII, pp. 64, 71, 1899.

miles back from the Mississippi River in northern St. Louis County. While he recognized the glacial nature of the deposits, he favored the

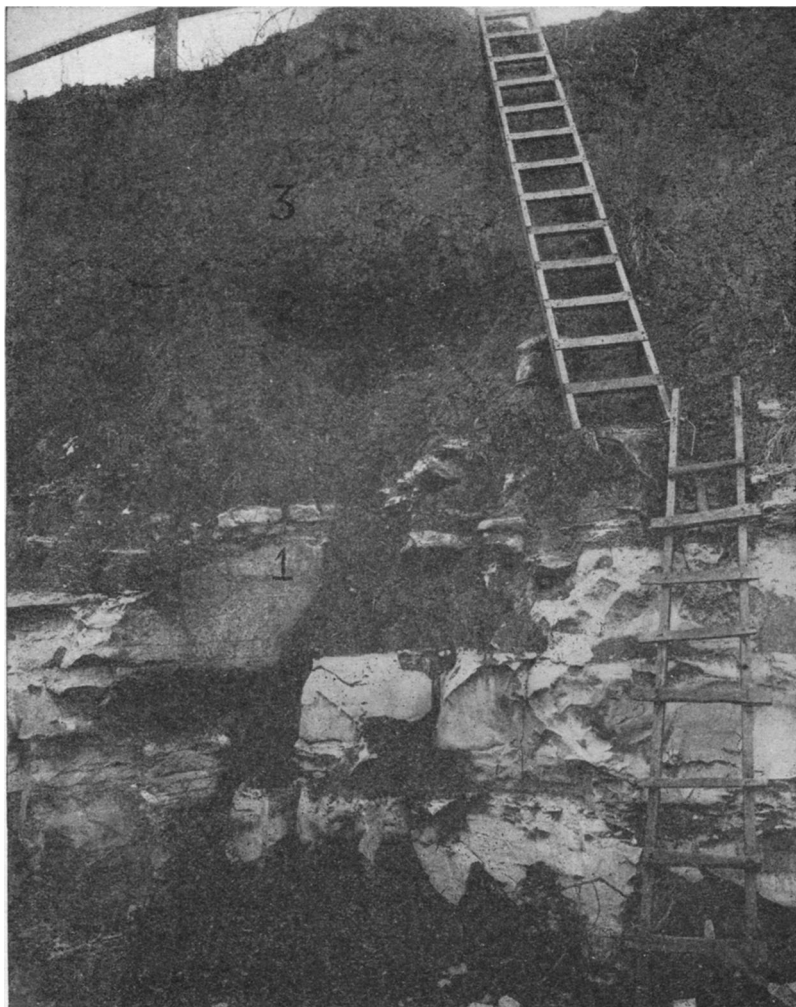


FIG. 1.—Exposure of loess and underlying till on the south side of the quarry at Grand Ave. and Rutger St. 1, St. Louis limestone, much decayed at the top; 2, bowlder clay; 3, loess.

idea that they were water-laid, basing his opinion on the water-worn appearance of the pebbles and cobbles, and the presence of pebbles

which had evidently come from outcrops in Calhoun and Lincoln counties, a few miles up the valley. "It remains an open question whether the ice sheet reached into northern St. Louis County from the Illinois side of the river."

So far as the writer knows, the foregoing is the sum total of reported investigation of a glacial drift under the St. Louis loess. It is the purpose of this paper to present additional evidence of a true drift in the above-mentioned region.

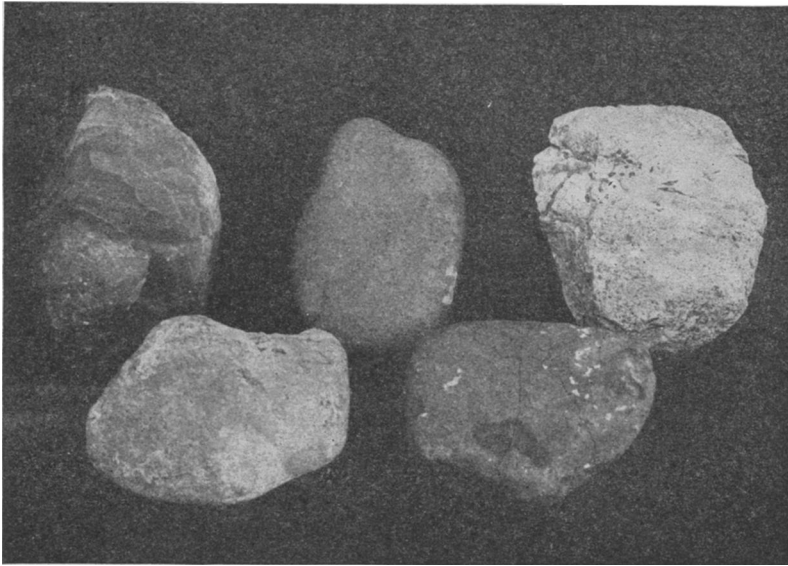


FIG. 2.—Pebbles from the boulder clay at St. Louis. *A* and *B*, quartzite; *C* and *D*, greenstone; *E*, chert. Reduced to less than three-eighths natural size.

At the quarry near Grand Ave. and Rutger St. may be seen a section of till resembling the material described by Todd. On the south side of the quarry the drift sheet is 4 feet thick, and lies on the deeply decayed St. Louis limestone. On the west side of the quarry the till is from 2 to 3 feet thick. The overlying loess has a thickness of from 12 to 17 feet. In places the contact between the loess and the clay is sharply defined (see Fig. 1). This clay differs from the loess in color, texture, and composition. It is red rather than buff colored, compact, and very sticky when moist. The upper portion

of it has a sheet of small water-worn pebbles. Occasional subangular and planed boulders are found in the clay beneath the pebbly sheet. The largest pebble found in this section by the writer is a chert shown in Fig. 2, *E*. Its dimensions are 13 by 10 by 8 centimeters.

On Meramec St., north of the Workhouse quarry, there is an outcrop of till on the south and east faces of the bluff. The deposit lies on the St. Louis limestone, and beneath loess 20 to 25 feet thick. The line of contact between loess and till is a sharp one. With the possible

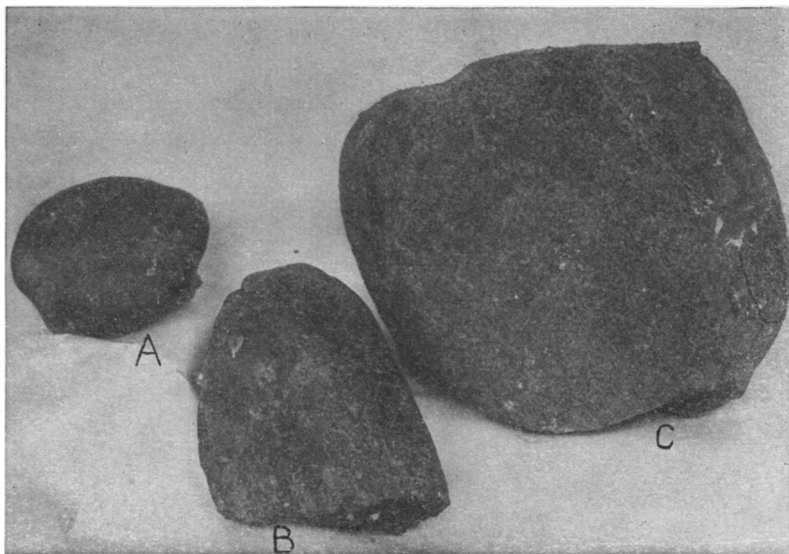


FIG. 3.—Pebbles from the boulder clay of St. Louis. *A*, ferruginous chert; *B*, felsite; *C*, sandstone. Reduced to about one-fourth natural size.

exception of Wheeler's section at West Pine Boulevard and Taylor Ave., the material at Meramec St. is more pebbly and bowldery than any till heretofore described as lying beneath the St. Louis loess. The sheet in the Meramec St. section is 2 to 3 feet thick, and contains boulders a foot in diameter. Boulders from 8 to 12 inches are quite numerous. Some of them show both planed and polished surfaces. Several boulders of granite, including a biotite granite of medium texture and others of a coarse, pegmatitic nature, have been found here. They not infrequently show planing, but are always much weathered inside.

Several pebbles of characteristic subangular shape and of a composition which shows them to be erratics are shown in Figs. 2 and 3. Fig. 3, *A*, is a ferruginous chert. It bears a resemblance to pebbles in a conglomerate at the base of the Sioux quartzite of southern Minnesota and northern Iowa. Cherts of this sort are also found, however, in the Mesabi and Penokee iron ranges of northern Michigan. Fig. 3, *B*, is a planed and polished pebble of dark-blue felsite which contains phenocrysts of feldspar and quartz. Fig. 3, *C*, is a sandstone with hematite cement, approaching a quartzite. In Fig. 2, *A* and *B* are quartzite resembling that at Sioux Falls, Ia.; *C* and *D* are medium-grained greenstone, planed on three faces. Pebbles and boulders representing the following rocks are found in this section: coarse sandstone, almost a quartzite, with silica and limonite cement; sandstone with hematite cement; quartzite; vein quartz; quartz porphyry; felsite; greenstone; biotite granite; pegmatite. While all these varieties might have come either from the southern Minnesota district or the Lake Superior district, it seems rather probable that the drift came from the former direction. This district is nearer than that of northern Michigan; and a southward direction of transportation would agree with Leverett's observations of pebbles from Calhoun and Lincoln counties.

From Meramec St. southward for several blocks exposures of boulder clay of varying thickness may be seen. Near the Hoffman-Hogan quarry is an outcrop resembling the one at Grand Ave. and Rutger St., described in this paper. Rhyolite, granite, and diabase pebbles have been found by the writer in these exposures.

While it is possible that in certain places the thin sheet of gravelly material under the St. Louis loess is glacial gravel, as described by some authors, rather than till, the sections described in this paper are without doubt true boulder clay. The variety in composition of the pebbles and boulders indicates collection from distant and scattered sources, and transportation by an ice sheet. The presence of many subangular pebbles with smooth and planed sides, associated with pebbles of less characteristic shapes, the heterogeneous mixture of boulders, pebbles, and fine clay, and the compactness and general consistency of this clay, are all indicative of till rather than of a water-made deposit. This sheet of drift has been observed by the writer

in the northwest, central, and southeast portions of the city. Considering these sections and those previously described, it seems that the sheet underlying the St. Louis loess is true glacial drift. It seems not unlikely that in other places as well as here the old drift sheets beneath the loess extend farther south than they have heretofore been fully recognized